



## SEQUENCE LISTING

<110> Nezu, Jun-Ichi  
Oku, Asuka

<120> TRANSPORTER GENES

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<140> 09/521,195

<141> 2000-03-07

<150> JP 10/156660

<151> 1998-05-20

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<151> 1997-09-08

<150> PCT/JP98/04009

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Gly Phe Asn Gly Met Ser Val Val Phe Leu Ala Gly Thr Pro Glu His  
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Arg Cys Arg Val Pro Asp Ala Ala Asn Leu Ser Ser Ala Trp Arg Asn  
50 55 60  
Asn Ser Val Pro Leu Arg Leu Arg Asp Gly Arg Glu Val Pro His Ser  
65 70 75 80  
Cys Ser Arg Tyr Arg Leu Ala Thr Ile Ala Asn Phe Ser Ala Leu Gly  
85 90 95  
Leu Glu Pro Gly Arg Asp Val Asp Leu Gly Gln Leu Glu Gln Glu Ser  
100 105 110  
Cys Leu Asp Gly Trp Glu Phe Ser Gln Asp Val Tyr Leu Ser Thr Val  
115 120 125  
Val Thr Glu Trp Asn Leu Val Cys Glu Asp Asn Trp Lys Val Pro Leu  
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Thr Thr Ser Leu Phe Phe Val Gly Val Leu Leu Gly Ser Phe Val Ser  
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Met Ala Val Gln Thr Gly Phe Ser Phe Leu Gln Ile Phe Ser Ile Ser  
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Trp Glu Met Phe Thr Val Leu Phe Val Ile Val Gly Met Gly Gln Ile  
195 200 205  
Ser Asn Tyr Val Val Ala Phe Ile Leu Gly Thr Glu Ile Leu Gly Lys  
210 215 220

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Ser Val Arg Ile Ile Phe Ser Thr Leu Gly Val Cys Thr Phe Phe Ala  
 225 230 235 240  
 Val Gly Tyr Met Leu Leu Pro Leu Phe Ala Tyr Phe Ile Arg Asp Trp  
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 Arg Met Leu Leu Leu Ala Leu Thr Val Pro Gly Val Leu Cys Val Pro  
 260 265 270  
 Leu Trp Trp Phe Ile Pro Glu Ser Pro Arg Trp Leu Ile Ser Gln Arg  
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 Arg Phe Arg Glu Ala Glu Asp Ile Ile Gln Lys Ala Ala Lys Met Asn  
 290 295 300  
 Asn Thr Ala Val Pro Ala Val Ile Phe Asp Ser Val Glu Glu Leu Asn  
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 Pro Leu Lys Gln Gln Lys Ala Phe Ile Leu Asp Leu Phe Arg Thr Arg  
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 Asp Ala Tyr Leu Asn Cys Phe Leu Ser Ala Leu Ile Glu Ile Pro Ala  
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 Tyr Ile Thr Ala Trp Leu Leu Leu Arg Thr Leu Pro Arg Arg Tyr Ile  
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 Ile Ala Ala Val Leu Phe Trp Gly Gly Gly Val Leu Leu Phe Ile Gln  
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 420 425 430  
 Gly Lys Phe Gly Ile Thr Ser Ala Phe Ser Met Leu Tyr Val Phe Thr  
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 Ala Glu Leu Tyr Pro Thr Leu Val Arg Asn Met Ala Val Gly Val Thr  
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 Phe Leu Gly Glu Trp Gly Pro Phe Gln Arg Leu Ile Phe Phe Leu Leu  
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 Ser Ala Ser Ile Ile Pro Asn Gly Phe Asn Gly Met Ser Val Val Phe  
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ctg gcg ggg acc ccg gag cac cgc tgt cga gtg ccg gac gcc gcg aac 317  
 Leu Ala Gly Thr Pro Glu His Arg Cys Arg Val Pro Asp Ala Ala Asn  
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ctg agc agc gcc tgg cgc aac aac agt gtc ccg ctg cgg ctg cgg gac 365  
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 Gly Arg Glu Val Pro His Ser Cys Ser Arg Tyr Arg Leu Ala Thr Ile  
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 Gly Gln Leu Glu Gln Glu Ser Cys Leu Asp Gly Trp Glu Phe Ser Gln  
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Gly Val Cys Thr Phe Phe Ala Val Gly Tyr Met Leu Leu Pro Leu Phe	
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Ala Tyr Phe Ile Arg Asp Trp Arg Met Leu Leu Ala Leu Thr Val	
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Pro Gly Val Leu Cys Val Pro Leu Trp Trp Phe Ile Pro Glu Ser Pro	
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Arg Trp Leu Ile Ser Gln Arg Arg Phe Arg Glu Ala Glu Asp Ile Ile	
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Gln Lys Ala Ala Lys Met Asn Asn Thr Ala Val Pro Ala Val Ile Phe	
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Asp Ser Val Glu Glu Leu Asn Pro Leu Lys Gln Gln Lys Ala Phe Ile	
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Leu Asp Leu Phe Arg Thr Arg Asn Ile Ala Ile Met Thr Ile Met Ser	
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Leu Leu Leu Trp Met Leu Thr Ser Val Gly Tyr Phe Ala Leu Ser Leu	
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Asp Ala Pro Asn Leu His Gly Asp Ala Tyr Leu Asn Cys Phe Leu Ser	
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Thr Leu Pro Arg Arg Tyr Ile Ile Ala Ala Val Leu Phe Trp Gly Gly	
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Gly Val Leu Leu Phe Ile Gln Leu Val Pro Val Asp Tyr Tyr Phe Leu	
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Ser Ile Gly Leu Val Met Leu Gly Lys Phe Gly Ile Thr Ser Ala Phe	
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Ser Met Leu Tyr Val Phe Thr Ala Glu Leu Tyr Pro Thr Leu Val Arg	

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tac atc gtc atg ggt agt ctg act gtc ctg att gga atc ttc acc ctt Tyr Ile Val Met Gly Ser Leu Thr Val Leu Ile Gly Ile Phe Thr Leu 490 495 500 505			1661
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His Arg Cys Arg Val Pro Asp Ala Ala Asn Leu Ser Ser Ala Trp Arg 50 55 60			
Asn His Thr Val Pro Leu Arg Leu Arg Asp Gly Arg Glu Val Pro His			

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Thr	Met	Gly	Met	Gln	Thr	Gly	Phe	Ser	Phe	Leu	Gln	Ile	Phe	Ser	Lys
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Asn	Phe	Glu	Met	Phe	Val	Val	Leu	Phe	Val	Leu	Val	Gly	Met	Gly	Gln
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Ile	Ser	Asn	Tyr	Val	Ala	Ala	Phe	Val	Leu	Gly	Thr	Glu	Ile	Leu	Gly
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Asn	Gly	Ile	Val	Val	Pro	Ser	Thr	Ile	Phe	Asp	Pro	Ser	Glu	Leu	Gln
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Asp	Leu	Ser	Ser	Lys	Lys	Gln	Gln	Ser	His	Asn	Ile	Leu	Asp	Leu	Leu
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Arg	Thr	Trp	Asn	Ile	Arg	Met	Val	Thr	Ile	Met	Ser	Ile	Met	Leu	Trp
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Met	Thr	Ile	Ser	Val	Gly	Tyr	Phe	Gly	Leu	Ser	Leu	Asp	Thr	Pro	Asn
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Leu	His	Gly	Asp	Ile	Phe	Val	Asn	Cys	Phe	Leu	Ser	Ala	Met	Val	Glu

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 Phe Met Gln Leu Val Pro Pro Asp Leu Tyr Tyr Leu Ala Thr Val Leu  
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 Val Met Val Gly Lys Phe Gly Val Thr Ala Ala Phe Ser Met Val Tyr  
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 Val Tyr Thr Ala Glu Leu Tyr Pro Thr Val Val Arg Asn Met Gly Val  
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 Gly Val Ser Ser Thr Ala Ser Arg Leu Gly Ser Ile Leu Ser Pro Tyr  
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 Phe Val Tyr Leu Gly Ala Tyr Asp Arg Phe Leu Pro Tyr Ile Leu Met  
     480                      485                      490                      495  
 Gly Ser Leu Thr Ile Leu Thr Ala Ile Leu Thr Leu Phe Leu Pro Glu  
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 Ser Phe Gly Thr Pro Leu Pro Asp Thr Ile Asp Gln Met Leu Arg Val  
                     515                      520                      525  
 Lys Gly Met Lys His Arg Lys Thr Pro Ser His Thr Arg Met Leu Lys  
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 ggc atg cgg gac tac gac gag gtg acc gcc ttc ctg ggc gag tgg ggg                      168  
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       1                      5                      10                      15  
 ccc ttc cag cgc ctc atc ttc ttc ctg ctc agc gcc agc atc atc ccc                      216  
 Pro Phe Gln Arg Leu Ile Phe Phe Leu Leu Ser Ala Ser Ile Ile Pro  
                     20                      25                      30

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ggg ctg gag ccg ggg cgc gac gtg gac ctg ggg cag ctg gag cag gag Gly Leu Glu Pro Gly Arg Asp Val Asp Leu Gly Gln Leu Glu Gln Glu 100 105 110	456
agc tgt ctg gat ggc tgg gag ttc agt cag gac gtc tac ctg tcc acc Ser Cys Leu Asp Gly Trp Glu Phe Ser Gln Asp Val Tyr Leu Ser Thr 115 120 125	504
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Gly	Arg	Phe	Glu	Glu	Ala	Glu	Val	Ile	Ile	Arg	Lys	Ala	Ala	Lys	Ala		
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Asp	Leu	Ser	Ser	Lys	Lys	Gln	Gln	Ser	His	Asn	Ile	Leu	Asp	Leu	Leu		
	320				325					330					335		
cga	acc	tgg	aat	atc	cgg	atg	gtc	acc	atc	atg	tcc	ata	atg	ctg	tgg		1176
Arg	Thr	Trp	Asn	Ile	Arg	Met	Val	Thr	Ile	Met	Ser	Ile	Met	Leu	Trp		
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Gly	Val	Ser	Ser	Thr	Ala	Ser	Arg	Leu	Gly	Ser	Ile	Leu	Ser	Pro	Tyr		
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Gly Ser Leu Thr Ile Leu Thr Ala Ile Leu Thr Leu Phe Leu Pro Glu				
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agc ttc ggt acc cca ctc cca gac acc att gac cag atg cta aga gtc				1704
Ser Phe Gly Thr Pro Leu Pro Asp Thr Ile Asp Gln Met Leu Arg Val				
	515	520	525	
aaa gga atg aaa cac aga aaa act cca agt cac aca agg atg tta aaa				1752
Lys Gly Met Lys His Arg Lys Thr Pro Ser His Thr Arg Met Leu Lys				
	530	535	540	
gat ggt caa gaa agg ccc aca atc ctt aaa agc aca gcc ttc				1794
Asp Gly Gln Glu Arg Pro Thr Ile Leu Lys Ser Thr Ala Phe				
	545	550	555	
taacatcgct tccagtaagg gagaaactga agaggaa				1831

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<220>  
 <223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

<400> 5  
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<210> 6  
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 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

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<210> 7  
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<220>  
 <223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

<400> 7  
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<210> 8

<211> 22  
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<210> 10  
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 <212> DNA  
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<400> 11  
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<210> 12  
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tcacacagga aacagctatg ac

22

<210> 13

<211> 24

<212> DNA

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<220>

<223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

<400> 13

gtgctggttg gctccttcat ttca

24

<210> 14

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<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

<400> 14

agctgcatga agagaaggac actg

24

<210> 15

<211> 24

<212> DNA

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<223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

<400> 15

agcatcctgt ctccctactt cggt

24

<210> 16

<211> 33

<212> DNA

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<400> 16

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33

<210> 17

<211> 33

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

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<210> 18  
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<212> DNA  
<213> Artificial Sequence

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<210> 19  
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<210> 20  
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<210> 21  
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<400> 21  
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<210> 22  
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&lt;212&gt; PRT

&lt;213&gt; Mus musculus

&lt;400&gt; 22

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Phe Gln Arg Leu Ile Phe Phe Leu Leu Ser Ala Ser Ile Ile Pro Asn
          20           25           30

Gly Phe Asn Gly Met Ser Val Val Phe Leu Ala Gly Thr Pro Glu His
          35           40           45

Arg Cys Leu Val Pro Asp Thr Val Asn Leu Ser Ser Ser Trp Arg Asn
          50           55           60

His Ser Ile Pro Leu Glu Thr Lys Asp Gly Arg Gln Val Pro Gln Ser
          65           70           75           80

Cys Arg Arg Tyr Arg Leu Ala Thr Ile Ala Asn Phe Ser Ala Met Gly
          85           90           95

Leu Glu Pro Gly Gln Asp Val Asp Leu Glu Gln Leu Glu Gln Glu Ser
          100          105          110

Cys Leu Asp Gly Trp Glu Tyr Asp Lys Asp Ile Phe Leu Ser Thr Ile
          115          120          125

Val Thr Glu Trp Asn Leu Val Cys Glu Asp Asp Trp Lys Thr Pro Leu
          130          135          140

Thr Thr Ser Leu Phe Phe Val Gly Val Leu Cys Gly Ser Phe Val Ser
          145          150          155          160

Gly Gln Leu Ser Asp Arg Phe Gly Arg Lys Lys Val Leu Phe Ala Thr
          165          170          175

Met Ala Val Gln Thr Gly Phe Ser Phe Val Gln Ile Phe Ser Thr Asn
          180          185          190

Trp Glu Met Phe Thr Val Leu Phe Ala Ile Val Gly Met Gly Gln Ile
          195          200          205

Ser Asn Tyr Val Val Ala Phe Ile Leu Gly Thr Glu Ile Leu Ser Lys
          210          215          220

Ser Val Arg Ile Ile Phe Ser Thr Leu Gly Val Cys Thr Phe Phe Ala
          225          230          235          240

Ile Gly Tyr Met Val Leu Pro Leu Phe Ala Tyr Phe Ile Arg Asp Trp
          245          250          255

Arg Met Leu Leu Leu Ala Leu Thr Leu Pro Gly Leu Phe Cys Val Pro
          260          265          270

Leu Trp Trp Phe Ile Pro Glu Ser Pro Arg Trp Leu Ile Ser Gln Arg
          275          280          285

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Arg Phe Ala Glu Ala Glu Gln Ile Ile Gln Lys Ala Ala Lys Met Asn  
 290 295 300  
 Ser Ile Val Ala Pro Ala Gly Ile Phe Asp Pro Leu Glu Leu Gln Glu  
 305 310 315 320  
 Leu Asn Ser Leu Lys Gln Gln Lys Val Ile Ile Leu Asp Leu Phe Arg  
 325 330 335  
 Thr Arg Asn Ile Ala Thr Ile Thr Val Met Ala Val Met Leu Trp Met  
 340 345 350  
 Leu Thr Ser Val Gly Tyr Phe Ala Leu Ser Leu Asn Val Pro Asn Leu  
 355 360 365  
 His Gly Asp Val Tyr Leu Asn Cys Phe Leu Ser Gly Leu Ile Glu Val  
 370 375 380  
 Pro Ala Tyr Phe Thr Ala Trp Leu Leu Leu Arg Thr Leu Pro Arg Arg  
 385 390 395 400  
 Tyr Ile Ile Ala Gly Val Leu Phe Trp Gly Gly Gly Val Leu Leu Leu  
 405 410 415  
 Ile Gln Val Val Pro Glu Asp Tyr Asn Phe Val Ser Ile Gly Leu Val  
 420 425 430  
 Met Leu Gly Lys Phe Gly Ile Thr Ser Ala Phe Ser Met Leu Tyr Val  
 435 440 445  
 Phe Thr Ala Glu Leu Tyr Pro Thr Leu Val Arg Asn Met Ala Val Gly  
 450 455 460  
 Ile Thr Ser Met Ala Ser Arg Val Gly Ser Ile Ile Ala Pro Tyr Phe  
 465 470 475 480  
 Val Tyr Leu Gly Ala Tyr Asn Arg Leu Leu Pro Tyr Ile Leu Met Gly  
 485 490 495  
 Ser Leu Thr Val Leu Ile Gly Ile Ile Thr Leu Phe Phe Pro Glu Ser  
 500 505 510  
 Phe Gly Val Thr Leu Pro Glu Asn Leu Glu Gln Met Gln Lys Val Arg  
 515 520 525  
 Gly Phe Arg Cys Gly Lys Lys Ser Thr Val Ser Val Asp Arg Glu Glu  
 530 535 540  
 Ser Pro Lys Val Leu Ile Thr Ala Phe  
 545 550

<210> 23  
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&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (122)..(1780)

&lt;400&gt; 23

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tcgctgaatc ctttctctcc acccacctcc ctcacgcaag ctgaggagga gaggtggaaa      120

c atg cgg gac tac gac gag gtg atc gcc ttc ctg ggc gag tgg ggg ccc      169
  Met Arg Asp Tyr Asp Glu Val Ile Ala Phe Leu Gly Glu Trp Gly Pro
    1         5         10        15
ttc cag cgc ctc atc ttc ttt ctg ctc agc gcc agc atc atc ccc aat      217
Phe Gln Arg Leu Ile Phe Phe Leu Leu Ser Ala Ser Ile Ile Pro Asn
    20        25        30

ggc ttc aat ggt atg tca gtc gtg ttc ctg gcg ggg acc ccc gag cac      265
Gly Phe Asn Gly Met Ser Val Val Phe Leu Ala Gly Thr Pro Glu His
    35        40        45

cgt tgc ctg gtt cct gac act gtg aac ctg agc agc tcc tgg cgc aac      313
Arg Cys Leu Val Pro Asp Thr Val Asn Leu Ser Ser Ser Trp Arg Asn
    50        55        60

cac agc atc ccc ttg gag acg aag gac gga cga cag gtg cct cag agc      361
His Ser Ile Pro Leu Glu Thr Lys Asp Gly Arg Gln Val Pro Gln Ser
    65        70        75        80

tgc cgc cgc tac cga ctg gcc acc atc gcc aac ttc tct gcg atg ggg      409
Cys Arg Arg Tyr Arg Leu Ala Thr Ile Ala Asn Phe Ser Ala Met Gly
    85        90        95

ctg gag cca gga cag gac gtg gat ctg gag cag ctg gag cag gag agc      457
Leu Glu Pro Gly Gln Asp Val Asp Leu Glu Gln Leu Glu Gln Glu Ser
    100       105       110

tgc ctg gat ggc tgg gag tac gac aag gac atc ttc ctg tcc acc atc      505
Cys Leu Asp Gly Trp Glu Tyr Asp Lys Asp Ile Phe Leu Ser Thr Ile
    115       120       125

gtg aca gag tgg aat ctg gtg tgt gag gat gac tgg aag aca ccc ctc      553
Val Thr Glu Trp Asn Leu Val Cys Glu Asp Asp Trp Lys Thr Pro Leu
    130       135       140

acc acc tcc ctg ttc ttc gta ggc gtt ctc tgc ggc tcc ttc gtg tct      601
Thr Thr Ser Leu Phe Phe Val Gly Val Leu Cys Gly Ser Phe Val Ser
    145       150       155       160

ggg cag ctg tca gac agg ttt ggc agg aag aaa gtc ctc ttt gca acc      649
Gly Gln Leu Ser Asp Arg Phe Gly Arg Lys Lys Val Leu Phe Ala Thr
    165       170       175

atg gct gtg cag act gga ttc agc ttc gtg cag att ttc tca acc aac      697
Met Ala Val Gln Thr Gly Phe Ser Phe Val Gln Ile Phe Ser Thr Asn
    180       185       190

tgg gag atg ttc act gtg ttg ttt gcc att gtg ggc atg ggc cag atc      745

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Trp	Glu	Met	Phe	Thr	Val	Leu	Phe	Ala	Ile	Val	Gly	Met	Gly	Gln	Ile		
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Ser	Asn	Tyr	Val	Val	Ala	Phe	Ile	Leu	Gly	Thr	Glu	Ile	Leu	Ser	Lys		
	210					215					220						
tcg	gtt	cgc	atc	atc	ttc	tcc	aca	tta	gga	gtc	tgt	aca	ttt	ttt	gca	841	
Ser	Val	Arg	Ile	Ile	Phe	Ser	Thr	Leu	Gly	Val	Cys	Thr	Phe	Phe	Ala		
	225				230					235					240		
atc	ggc	tac	atg	gtc	ctg	ccg	ctg	ttt	gca	tac	ttc	atc	aga	gac	tgg	889	
Ile	Gly	Tyr	Met	Val	Leu	Pro	Leu	Phe	Ala	Tyr	Phe	Ile	Arg	Asp	Trp		
				245					250					255			
agg	atg	ctg	ctg	ctg	gcc	ctg	aca	ctg	cct	ggc	ctg	ttc	tgt	gtt	ccc	937	
Arg	Met	Leu	Leu	Leu	Ala	Leu	Thr	Leu	Pro	Gly	Leu	Phe	Cys	Val	Pro		
		260						265					270				
ctg	tgg	tgg	ttt	att	cca	gaa	tct	ccc	cgg	tgg	ctg	ata	tcc	cag	agg	985	
Leu	Trp	Trp	Phe	Ile	Pro	Glu	Ser	Pro	Arg	Trp	Leu	Ile	Ser	Gln	Arg		
	275						280					285					
aga	ttt	gca	gag	gcc	gaa	cag	atc	atc	cag	aaa	gcc	gca	aag	atg	aac	1033	
Arg	Phe	Ala	Glu	Ala	Glu	Gln	Ile	Ile	Gln	Lys	Ala	Ala	Lys	Met	Asn		
	290					295				300							
agc	atc	gtg	gcg	cca	gca	ggg	ata	ttc	gat	cct	cta	gag	cta	cag	gag	1081	
Ser	Ile	Val	Ala	Pro	Ala	Gly	Ile	Phe	Asp	Pro	Leu	Glu	Leu	Gln	Glu		
	305				310					315					320		
cta	aac	tcc	ttg	aag	cag	cag	aaa	gtc	ata	atc	ctg	gac	ctg	ttc	agg	1129	
Leu	Asn	Ser	Leu	Lys	Gln	Gln	Lys	Val	Ile	Ile	Leu	Asp	Leu	Phe	Arg		
				325				330						335			
act	cgg	aac	att	gcc	acc	ata	acc	gtg	atg	gct	gtg	atg	ctg	tgg	atg	1177	
Thr	Arg	Asn	Ile	Ala	Thr	Ile	Thr	Val	Met	Ala	Val	Met	Leu	Trp	Met		
			340					345					350				
cta	acc	tca	gtg	ggt	tac	ttt	gct	ctg	tct	ctc	aat	gtt	cct	aat	tta	1225	
Leu	Thr	Ser	Val	Gly	Tyr	Phe	Ala	Leu	Ser	Leu	Asn	Val	Pro	Asn	Leu		
		355					360					365					
cat	gga	gat	gtc	tac	ctg	aac	tgc	ttc	ctc	tct	ggc	ctg	att	gaa	gtt	1273	
His	Gly	Asp	Val	Tyr	Leu	Asn	Cys	Phe	Leu	Ser	Gly	Leu	Ile	Glu	Val		
	370					375					380						
cca	gct	tac	ttc	aca	gcc	tgg	ctg	cta	ctg	cga	acc	ctg	cca	cgg	aga	1321	
Pro	Ala	Tyr	Phe	Thr	Ala	Trp	Leu	Leu	Leu	Arg	Thr	Leu	Pro	Arg	Arg		
	385				390					395					400		
tat	att	ata	gct	ggg	gtg	cta	ttc	tgg	gga	gga	ggt	gtg	ctt	ctc	ttg	1369	
Tyr	Ile	Ile	Ala	Gly	Val	Leu	Phe	Trp	Gly	Gly	Gly	Val	Leu	Leu	Leu		
			405					410						415			
atc	caa	gtg	gta	cct	gaa	gat	tat	aac	ttt	gtg	tcc	att	gga	ctg	gtg	1417	
Ile	Gln	Val	Val	Pro	Glu	Asp	Tyr	Asn	Phe	Val	Ser	Ile	Gly	Leu	Val		

420	425	430	
atg ctg ggg aaa ttt ggg atc acc tct gcc ttc tcc atg ttg tat gtc			1465
Met Leu Gly Lys Phe Gly Ile Thr Ser Ala Phe Ser Met Leu Tyr Val			
435	440	445	
ttc act gcg gag ctc tac cca acc ctg gtc agg aac atg gct gtg ggc			1513
Phe Thr Ala Glu Leu Tyr Pro Thr Leu Val Arg Asn Met Ala Val Gly			
450	455	460	
atc acc tcc atg gcc tct cgg gtg ggc agc atc att gcc ccc tat ttc			1561
Ile Thr Ser Met Ala Ser Arg Val Gly Ser Ile Ile Ala Pro Tyr Phe			
465	470	475	480
gtt tac ctg ggc gcc tat aac aga ctc cta ccc tac atc ctc atg ggc			1609
Val Tyr Leu Gly Ala Tyr Asn Arg Leu Leu Pro Tyr Ile Leu Met Gly			
485	490	495	
agt ctg act gtc ctc att gga atc atc acg ctt ttt ttc cct gaa agt			1657
Ser Leu Thr Val Leu Ile Gly Ile Ile Thr Leu Phe Phe Pro Glu Ser			
500	505	510	
ttt gga gtg act cta cca gag aac ttg gag cag atg cag aaa gtg aga			1705
Phe Gly Val Thr Leu Pro Glu Asn Leu Glu Gln Met Gln Lys Val Arg			
515	520	525	
ggg ttc aga tgt ggg aaa aaa tca aca gtc tca gtg gac aga gaa gaa			1753
Gly Phe Arg Cys Gly Lys Lys Ser Thr Val Ser Val Asp Arg Glu Glu			
530	535	540	
agc ccc aag gtt cta ata act gca ttc taacgaggtt tccaaggcac			1800
Ser Pro Lys Val Leu Ile Thr Ala Phe			
545	550		
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cccagcgctc ttgggggtgga gacagaagat caggagttca aggtcatcct tggctacagc			1920
aggagtgtaa gaccagcctg tcttaccaca agcaaccctg tctcaacaga acaaatcaaa			1980
agcctttttct gctgaaaggg attaacagaa acaatgagca ccaaactgga cttgtggaga			2040
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<210> 26  
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                   20                  25                  30  
 Gly Phe Asn Gly Met Ser Ile Val Phe Leu Ala Gly Thr Pro Glu His  
                   35                  40                  45  
 Arg Cys Leu Val Pro His Thr Val Asn Leu Ser Ser Ala Trp Arg Asn  
                   50                  55                  60  
 His Ser Ile Pro Leu Glu Thr Lys Asp Gly Arg Gln Val Pro Gln Lys  
   65                  70                  75                  80  
 Cys Arg Arg Tyr Arg Leu Ala Thr Ile Ala Asn Phe Ser Glu Leu Gly  
                   85                  90                  95  
 Leu Glu Pro Gly Arg Asp Val Asp Leu Glu Gln Leu Glu Gln Glu Ser  
                   100                  105                  110  
 Cys Leu Asp Gly Trp Glu Tyr Asp Lys Asp Val Phe Leu Ser Thr Ile  
                   115                  120                  125  
 Val Thr Glu Trp Asp Leu Val Cys Lys Asp Asp Trp Lys Ala Pro Leu  
                   130                  135                  140  
 Thr Thr Ser Leu Phe Phe Val Gly Val Leu Met Gly Ser Phe Ile Ser

145		150		155		160
Gly Gln Leu Ser Asp Arg Phe Gly Arg Lys Asn Val Leu Phe Leu Thr						
		165		170		175
Met Gly Met Gln Thr Gly Phe Ser Phe Leu Gln Val Phe Ser Val Asn						
		180		185		190
Phe Glu Met Phe Thr Val Leu Phe Val Leu Val Gly Met Gly Gln Ile						
		195		200		205
Ser Asn Tyr Val Ala Ala Phe Val Leu Gly Thr Glu Ile Leu Ser Lys						
		210		215		220
Ser Ile Arg Ile Ile Phe Ala Thr Leu Gly Val Cys Ile Phe Tyr Ala						
		225		230		235
Phe Gly Phe Met Val Leu Pro Leu Phe Ala Tyr Phe Ile Arg Asp Trp						
		245		250		255
Arg Met Leu Leu Leu Ala Leu Thr Val Pro Gly Val Leu Cys Gly Ala						
		260		265		270
Leu Trp Trp Phe Ile Pro Glu Ser Pro Arg Trp Leu Ile Ser Gln Gly						
		275		280		285
Arg Ile Lys Glu Ala Glu Val Ile Ile Arg Lys Ala Ala Lys Ile Asn						
		290		295		300
Gly Ile Val Ala Pro Ser Thr Ile Phe Asp Pro Ser Glu Leu Gln Asp						
		305		310		315
Leu Asn Ser Thr Lys Pro Gln Leu His His Ile Tyr Asp Leu Ile Arg						
		325		330		335
Thr Arg Asn Ile Arg Val Ile Thr Ile Met Ser Ile Ile Leu Trp Leu						
		340		345		350
Thr Ile Ser Val Gly Tyr Phe Gly Leu Ser Leu Asp Thr Pro Asn Leu						
		355		360		365
His Gly Asp Ile Tyr Val Asn Cys Phe Leu Leu Ala Ala Val Glu Val						
		370		375		380
Pro Ala Tyr Val Leu Ala Trp Leu Leu Leu Gln Tyr Leu Pro Arg Arg						
		385		390		395
Tyr Ser Ile Ser Ala Ala Leu Phe Leu Gly Gly Ser Val Leu Leu Phe						
		405		410		415
Met Gln Leu Val Pro Ser Glu Leu Phe Tyr Leu Ser Thr Ala Leu Val						
		420		425		430
Met Val Gly Lys Phe Gly Ile Thr Ser Ala Tyr Ser Met Val Tyr Val						
		435		440		445
Tyr Thr Ala Glu Leu Tyr Pro Thr Val Val Arg Asn Met Gly Val Gly						

450	455	460	
Val Ser Ser Thr Ala Ser Arg Leu Gly Ser Ile Leu Ser Pro Tyr Phe			
465	470	475	480
Val Tyr Leu Gly Ala Tyr Asp Arg Phe Leu Pro Tyr Ile Leu Met Gly			
	485	490	495
Ser Leu Thr Ile Leu Thr Ala Ile Leu Thr Leu Phe Phe Pro Glu Ser			
	500	505	510
Phe Gly Val Pro Leu Pro Asp Thr Ile Asp Gln Met Leu Arg Val Lys			
	515	520	525
Gly Ile Lys Gln Trp Gln Ile Gln Ser Gln Thr Arg Met Gln Lys Asp			
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Gly Glu Glu Ser Pro Thr Val Leu Lys Ser Thr Ala Phe			
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Met Arg Asp Tyr Asp Glu Val Thr Ala Phe Leu Gly Glu Trp Gly Pro			
1	5	10	15
ttc cag cgc ctc atc ttc ttc ctg ctc agc gcc agc atc atc ccc aat			155
Phe Gln Arg Leu Ile Phe Phe Leu Leu Ser Ala Ser Ile Ile Pro Asn			
	20	25	30
ggc ttc aat ggt atg tcc atc gtg ttc ctg gcg ggg acc ccg gag cac			203
Gly Phe Asn Gly Met Ser Ile Val Phe Leu Ala Gly Thr Pro Glu His			
	35	40	45
cgt tgc ctt gtg cct cac acc gtg aac ctg agc agc gcg tgg cgc aac			251
Arg Cys Leu Val Pro His Thr Val Asn Leu Ser Ser Ala Trp Arg Asn			
	50	55	60
cac agt atc ccg ttg gag acg aag gac gga cga cag gtg cct cag aaa			299
His Ser Ile Pro Leu Glu Thr Lys Asp Gly Arg Gln Val Pro Gln Lys			
	65	70	80
tgc cgc cgc tac cga ctg gcc acc atc gcc aac ttc tct gag cta ggg			347
Cys Arg Arg Tyr Arg Leu Ala Thr Ile Ala Asn Phe Ser Glu Leu Gly			
	85	90	95
ctg gag ccg ggg cgg gac gtg gac ctg gag cag ctg gag cag gag agc			395

Leu	Glu	Pro	Gly	Arg	Asp	Val	Asp	Leu	Glu	Gln	Leu	Glu	Gln	Glu	Ser		
			100					105						110			
tgc	ctg	gat	ggc	tgg	gag	tac	gac	aag	gac	gtc	ttc	ctg	tcc	acc	atc	443	
Cys	Leu	Asp	Gly	Trp	Glu	Tyr	Asp	Lys	Asp	Val	Phe	Leu	Ser	Thr	Ile		
		115					120					125					
gtg	aca	gag	tgg	gac	ctg	gtg	tgt	aag	gat	gac	tgg	aaa	gcc	cca	ctc	491	
Val	Thr	Glu	Trp	Asp	Leu	Val	Cys	Lys	Asp	Asp	Trp	Lys	Ala	Pro	Leu		
	130					135					140						
acc	acc	tcc	ttg	ttt	ttc	gtg	ggc	gtg	ctg	atg	ggc	tcc	ttc	att	tca	539	
Thr	Thr	Ser	Leu	Phe	Phe	Val	Gly	Val	Leu	Met	Gly	Ser	Phe	Ile	Ser		
145					150				155						160		
gga	cag	ctc	tca	gac	agg	ttt	ggc	cgc	aag	aat	gtg	ctg	ttt	ttg	acc	587	
Gly	Gln	Leu	Ser	Asp	Arg	Phe	Gly	Arg	Lys	Asn	Val	Leu	Phe	Leu	Thr		
			165						170					175			
atg	ggc	atg	cag	act	ggc	ttc	agc	ttc	ctg	cag	gtc	ttc	tct	gtg	aac	635	
Met	Gly	Met	Gln	Thr	Gly	Phe	Ser	Phe	Leu	Gln	Val	Phe	Ser	Val	Asn		
			180					185					190				
ttc	gag	atg	ttt	aca	gtg	ctt	ttt	gtc	ctt	gtt	ggc	atg	ggc	cag	atc	683	
Phe	Glu	Met	Phe	Thr	Val	Leu	Phe	Val	Leu	Val	Gly	Met	Gly	Gln	Ile		
		195				200						205					
tcc	aac	tac	gtg	gca	gca	ttt	gtc	ctg	gga	aca	gaa	att	ctt	tcc	aag	731	
Ser	Asn	Tyr	Val	Ala	Ala	Phe	Val	Leu	Gly	Thr	Glu	Ile	Leu	Ser	Lys		
	210					215					220						
tca	att	cga	att	ata	ttc	gcc	acc	tta	gga	gtt	tgc	ata	ttt	tat	gcg	779	
Ser	Ile	Arg	Ile	Ile	Phe	Ala	Thr	Leu	Gly	Val	Cys	Ile	Phe	Tyr	Ala		
225					230				235						240		
ttt	ggc	ttc	atg	gtg	ctg	cca	ctg	ttt	gca	tac	ttc	atc	aga	gac	tgg	827	
Phe	Gly	Phe	Met	Val	Leu	Pro	Leu	Phe	Ala	Tyr	Phe	Ile	Arg	Asp	Trp		
				245				250						255			
agg	atg	ctg	ctg	ctg	gcg	ctc	act	gtg	cca	ggg	gtg	cta	tgt	ggg	gct	875	
Arg	Met	Leu	Leu	Leu	Ala	Leu	Thr	Val	Pro	Gly	Val	Leu	Cys	Gly	Ala		
			260					265					270				
ctc	tgg	tgg	ttc	atc	cct	gag	tcc	cca	cga	tgg	ctc	atc	tct	caa	ggc	923	
Leu	Trp	Trp	Phe	Ile	Pro	Glu	Ser	Pro	Arg	Trp	Leu	Ile	Ser	Gln	Gly		
		275					280					285					
cga	att	aaa	gag	gca	gag	gtg	atc	atc	cgc	aaa	gct	gcc	aaa	atc	aat	971	
Arg	Ile	Lys	Glu	Ala	Glu	Val	Ile	Ile	Arg	Lys	Ala	Ala	Lys	Ile	Asn		
	290					295					300						
ggg	att	ggt	gca	cct	tcc	act	atc	ttc	gat	cca	agt	gag	tta	caa	gac	1019	
Gly	Ile	Val	Ala	Pro	Ser	Thr	Ile	Phe	Asp	Pro	Ser	Glu	Leu	Gln	Asp		
305					310				315						320		
tta	aat	tct	acg	aag	cct	cag	ttg	cac	cac	att	tat	gat	ctg	atc	cga	1067	
Leu	Asn	Ser	Thr	Lys	Pro	Gln	Leu	His	His	Ile	Tyr	Asp	Leu	Ile	Arg		

325	330	335	
aca cgg aat atc agg gtc atc acc atc atg tct ata atc ctg tgg ctg Thr Arg Asn Ile Arg Val Ile Thr Ile Met Ser Ile Ile Leu Trp Leu 340 345 350			1115
acc ata tca gtg ggc tat ttt gga cta tct ctt gac act cct aac ttg Thr Ile Ser Val Gly Tyr Phe Gly Leu Ser Leu Asp Thr Pro Asn Leu 355 360 365			1163
cat ggg gac atc tat gtg aac tgc ttc cta ctg gcg gct gtt gaa gtc His Gly Asp Ile Tyr Val Asn Cys Phe Leu Leu Ala Ala Val Glu Val 370 375 380			1211
cca gcc tat gtg ctg gcc tgg ctg ttg ttg cag tac ttg ccc cgg cga Pro Ala Tyr Val Leu Ala Trp Leu Leu Leu Gln Tyr Leu Pro Arg Arg 385 390 395 400			1259
tat tct atc tcg gct gcc ctt ttc ctg ggt ggc agt gtc ctt ctc ttc Tyr Ser Ile Ser Ala Ala Leu Phe Leu Gly Gly Ser Val Leu Leu Phe 405 410 415			1307
atg cag ctg gtg cct tca gaa ttg ttt tac ttg tcc act gcc ctg gtg Met Gln Leu Val Pro Ser Glu Leu Phe Tyr Leu Ser Thr Ala Leu Val 420 425 430			1355
atg gtg ggg aag ttt gga atc acc tct gcc tac tcc atg gtc tat gtg Met Val Gly Lys Phe Gly Ile Thr Ser Ala Tyr Ser Met Val Tyr Val 435 440 445			1403
tac aca gct gag ctg tac ccc act gtg gtc aga aac atg ggt gtg ggg Tyr Thr Ala Glu Leu Tyr Pro Thr Val Val Arg Asn Met Gly Val Gly 450 455 460			1451
gtc agc tcc aca gca tcc cgc ctt ggc agc atc ctg tct ccc tac ttt Val Ser Ser Thr Ala Ser Arg Leu Gly Ser Ile Leu Ser Pro Tyr Phe 465 470 475 480			1499
gtt tac cta ggt gcc tat gat cgc ttc ctg cct tat att ctc atg gga Val Tyr Leu Gly Ala Tyr Asp Arg Phe Leu Pro Tyr Ile Leu Met Gly 485 490 495			1547
agt ctg acc atc ctg aca gct atc ctc acc ttg ttc ttc cct gag agc Ser Leu Thr Ile Leu Thr Ala Ile Leu Thr Leu Phe Phe Pro Glu Ser 500 505 510			1595
ttt ggt gtc cct ctc cca gat acc att gac cag atg cta agg gtc aaa Phe Gly Val Pro Leu Pro Asp Thr Ile Asp Gln Met Leu Arg Val Lys 515 520 525			1643
gga ata aaa cag tgg caa atc caa agc cag aca aga atg caa aaa gat Gly Ile Lys Gln Trp Gln Ile Gln Ser Gln Thr Arg Met Gln Lys Asp 530 535 540			1691
ggt gaa gaa agc cca aca gtc cta aag agc aca gcc ttc taacaccctg Gly Glu Glu Ser Pro Thr Val Leu Lys Ser Thr Ala Phe 545 550 555			1740

tccagaaggc aaaaaactga ttggaaacct tcatgttgtc agaaatgctc tccatgactg 1800  
 agggcttttc tgttctgtta accttgtgtc taacatgctc atggattggg gcatctgtcc 1860  
 tggagagtca ccttcctcta gggacacc 1888

<210> 29  
 <211> 44  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

<400> 29  
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<210> 30  
 <211> 43  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

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<210> 31  
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 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

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<210> 32  
 <211> 11  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Artificial Synthesized Primer Sequence

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 accgccctcc g 11

<210> 33  
 <211> 14



<212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Exemplary motif

<221> VARIANT  
 <222> 1  
 <223> Xaa = Leu, Ile, Val, Met, Ser, Thr, Ala, or Gly

<221> VARIANT  
 <222> 2  
 <223> Xaa = Leu, Ile, Val, Met, Phe, Ser, Ala, or Gly

<221> VARIANT  
 <222> 3, 6, 11-13  
 <223> Xaa = any amino acid

<221> VARIANT  
 <222> 4  
 <223> Xaa = Leu, Ile, Val, Met, Ser, or Ala

<221> VARIANT  
 <222> 5  
 <223> Xaa = Asp, or Glu

<221> VARIANT  
 <222> 7  
 <223> Xaa = Leu, Ile, Val, Met, Phe, Tyr, Trp, or Ala

<221> VARIANT  
 <222> 10  
 <223> Xaa = Arg, or Lys

<221> VARIANT  
 <222> 14  
 <223> Xaa = Gly, Ser, Thr, or Ala

<400> 33  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gly Arg Xaa Xaa Xaa Xaa Xaa  
 1 5 10

ce<sup>2</sup>  
 cont